

Read November 21, 1771.

XLIV *Variation of the Compass, as observed on board the Endeavour Bark, in a Voyage round the World. Communicated by Lieut. James Cook, Commander of the said Bark.*

N. B. THE day of the month is noted according to the nautical account, which therefore in all the observations noted P. M. is one day forwarder than the civil account. The latitude *in* is deduced from the last preceding meridian altitude of the sun; and the longitude *in* is corrected by the last observations of the distances of the moon from the sun and stars.

Time		Lat. in	Long. in	Variation		Remarks
		North	West	How found	Means	
1768			West from Greenwich		° ' "	
August	8	English Channel			23 0 W.	From the Downs to Madeira
September	5	C. Finestre S. by $\frac{1}{2}$ W. 6 leagues		pr. Azimuths	18 42	
	6	42 1	9 50 W.	pr. Azimuths	21 40	
	7	40 29	10 11	pr. Azimuths	21 4	
	9	37 4	11 34	pr. Azimuths	19 50	
P. M. }	10	36 46	11 58	pr. Azimuths	21 19	
A. M. }		35 40	13 4	pr. Amplitudes	20 39	
				pr. Azimuths & Amplitudes	18 32	
P. M. }	11	34 58	13 50	pr. Azim. & Amplitudes	17 27	
A. M. }		34 20	14 20	pr. Amplitudes	15 30	
		Funchal island of Madeira			16 30	These are taken from Dr. Heberden, F. R. S. who resided upon the island.
		32 33 33	16 49		16 30	
	20	Funchal island of Madeira N. 76 E. dist. 19 leag.		pr. Azimuths	17 50	
	22	Salvages S. dist. 9 or 10 leag.		pr. Azimuths		

Time

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1768 September	North	West		o /	
23	29 40	15 30		$\left\{ \begin{array}{l} 17 \ 30 \text{ W.} \\ 17 \ 00 \\ 17 \ 15 \\ 18 \ 30 \end{array} \right.$	Found by taking the $\odot$ 's Azim. at equal Altitudes, before and after- noon. Passage to Rio de Janeiro.
P. M. Do.			pr. Amplitudes	18 30	
A. M.	29 7	15 50	pr. Azimuths	16 30	
24 P. M. {	Pico Teneriff N. 18 E. Distance 140 miles		pr. Azimuths	16 43	
24 A. M.	26 50	17 12	pr. Amplitudes	15 46	
25 P. M.	25 20	18 50	Ditto	14 58	
28 { A.M.	20 56	20 40	pr. Amplitudes	15 1	
{ P.M.	19 33	20 50	pr. Sev. Azim.	12 46	
29 P. M.	18 38	21 0	Ditto	12 43	
October			pr. Azimuths	12 33	
1 { P. M.	15 40	22 0	Ditto	10 37	
{ A.M.	14 35	22 8	Ditto	10 0	
	by another Compass		Ditto	11 40	
3	12 24	22 22	Amplitudes	8 49	
5 P. M.	11 53	22 0	pr. Azimuths	$\left\{ \begin{array}{l} 6 \ 10 \\ 6 \ 59 \end{array} \right.$	
6 A. M.	9 45	22 20	pr. Amp. 5		
8 { P. M.	9 42	22 19	pr. S. Az. 6	21 8 52	Towards Rio Janeiro.
{ A.M.	8 46	22 4	Ditto	9 0	
			Ditto 8 12	8 0	
			Ditto 7 47		
9 { P. M.	8 12	22 4	Ditto 8 23	$\left\{ \begin{array}{l} 8 \ 21 \frac{1}{2} \\ 8 \ 20 \end{array} \right.$	
{ A.M.	8 6	22 13	pr. Amplitudes		
			7 48	7 48	
10 P. M.	7 48	22 13	pr. Sev. Azim.	8 39	
13 P. M.	7 13	22 33	Ditto	8 54	
16 P. M.	6 50	23 46	Ditto	8 40	
21	3 4	26 30	Ditto	4 2	
			Amplitudes		
22 A. M.	2 0	27 55	pr. Azimuths	$\left\{ \begin{array}{l} 3 \ 13 \\ 3 \ 21 \end{array} \right.$	
			pr. Am. 2		
25 P. M.	0 55	28 55	pr. Azimuths	$\left\{ \begin{array}{l} 2 \ 24 \frac{1}{2} \\ 2 \ 33 \end{array} \right.$	
			Ditto 2		

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1768 October	° /	° /		° /	
	South	West			
27 A. M.	2 3	31 0	Ditto	2 48 W.	
29 P. M.	3 59	32 30	Ditto	2 25	
30 P. M.	5 46	32 48	pr. Sev. Azim.	1 31	
31 P. M.	7 30	33 4	Ditto	0 15	
November					
1 { P. M. }	9 22	33 16	Ditto	0 58	
1 { A. M. }			Ditto	0 18	
2 P. M.	10 3	33 0	Ditto	0 34 E.	
3 P. M.	12 27	33 0	Ditto	0 47	
4 P. M.	15 25	33 40	Ditto	1 23	
7 P. M.	18 30	36 10	Ditto	4 41	
8 { P. M. }	20 4	37 18	Ditto	5 26	} In soundings off the coast of Brazil.
8 { A. M. }			Ditto	7 52	
12 P. M.	Cape Fario W. N. W. dist. 12 leagues			6 40	
13 P. M.	{ Entrance Rio de Janeiro W. N. W. dist. 5 leagues }			7 34	
December					
12 { P. M. }	25 44	41 4	pr. Amplitudes	8 40	Passage to Terra dell Fuego.
12 { A. M. }			pr. Sev. Azim.	8 23	
13 P. M.	26 34	41 33	Ditto	8 23	
16 P. M.	30 20	41 49	Ditto	9 36	
18 P. M.	32 30	42 48	Ditto	11 3	
19 P. M.	32 54	43 38	Amplitudes	11 3	
20 P. M.	34 34	45 38	pr. Sev. Azim.	13 44	
22 { P. M. }	36 50	48 32	{ Azim. 15 1 }	15 1	
			{ Amp. 15 1 }		
22 { A. M. }	37 8	49 1	pr. Amplitude	16 1	
23 { P. M. }	37 8	49 0	{ pr. Az. 15 24 }	15 45	
			{ Amp. 16 5 }		
23 { A. M. }	36 46	49 2	pr. Amplitude	15 30	
29 P. M.	41 40	56 25	pr. D°. 16 12 }	16 22	In soundings off the coast of South A- merica.
			pr. Azimuth }		
31 P. M.	42 40	60 25	pr. D°. 18 44 }	18 36	
			pr. Amplitude }		
			18 22 }		

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Mean	
1769 January	° , South	° , West		° ,	
5 P. M.	48 42	60 51	pr. Am. 20 0 Amp. 20 9	20 4½ E.	
9 P. M.	51 30	63 30	pr. Several Az.	22 24	
10 P. M.	52 40	65 20	Ditto	21 57	
11 A. M.	54 0	67 30	Ditto	23 30	
	10 leag. from Terra del Feugo				
21 A. M.	Strait le Mare Ditto			24 9	
22 A. M.	56 7	65 45	per Several Az.	25 4	
	{ Near some isle on the coast of Terradel Feugo E. of C. Horne. }		ditto	21 0	{ Here the varia- tion seems to be affected by the land, as these ob- servations were well made.
24	55 40				
25 A. M.	55 40	{ C. Horne S.W. 3 W. 8 leag. }	pr. Amp.	21 16	{ Passage from Cape Horne to Ota-hitee.
28 P. M.	57 0	69 0	pr. several Az.	22 0	
30 P. M.	60 10	74 26	Ditto	27 9	{ Mean result of many azim. the sea calm and smooth.
February					
1 P. M.	59 23	76 45	Ditto	24 53	
3 P. M.	58 30	80 58	Ditto	24 4	
13 P. M.	49 13	89 36	Ditto	17 0	
15 { P. M.	48 56	91 27	Ditto	12 0	
{ A. M.	48 10	92 0	Ditto	11 0	
21 A. M.	44 39	103 0	Ditto	6 30	
23 P. M.	39 43	105 52	Ditto	5 34	
27 A. M.	39 43	110 26	pr. Amp. 2 17 pr. Azim. 2 24	2 20½	
March					
4 P. M.	36 49	111 54	Ditto 2 6 Amp. 2 46	2 26	
8 P. M.	37 8	116 8	pr. Several Az.	3 13	
9 P. M.	37 24	117 41	Ditto	4 41	{ Passage from Cape Horne to Ota- hitee
10 P. M.	35 30	119 30	Ditto	1 42	
11 Ditto	34 0	121 0	Ditto	4 12	
12 Ditto	32 40	123 0	Ditto	4 23	
13 { P. M.	31 20	124 40	Amplitudes	3 20	
{ A. M.	30 56	125 20	pr. Azimuths	3 0	

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1769 March	° /	° /		° /	
	South				
15 { P. M.	30 30	126 0	pr. Azimuths	3 45 E.	
15 { A. M.	29 36	126 50	Ditto	3 22	
16 { P. M.	29 32	126 48	pr. 21 Azimuths	1 30	
16 { A. M.	29 28	127 4	Ditto	2 18	
17 P. M.	29 10	127 16	Ditto	3 27	
19 A. M.	27 40	129 20	Ditto	3 14	
21 A. M.	25 21	129 28	Amplit. 3 0 pr. Azim. 3 43	3 21½	
22 Ditto	25 21	129 32	Azimuth	3 10	
28 P. M.	21 14	127 38	Amplitudes	3 56	
29 P. M.	20 29	127 44	pr. Several Az.	2 27	
31 P. M.	19 30	129 10	Ditto	2 25	
April					
1 P. M.	19 7	131 40	Ditto	2 32	
4 { P. M.	18 46	138 0	Ditto	2 54	
4 { A. M.	18 36	139 10	Ditto	2 54	
5 P. M.	18 36	139 40	Amplitude	3 30	
8 P. M.	17 48	143 50	Several Azim.	6 32	
9 P. M.	17 36	145 30	Ditto	4 54	
10 P. M.	17 42	146 16	Ditto	5 41	
11 P. M.	18 0	147 59	Ditto	6 30	
August	17 29	149 30	Meridian line	4 45½	
16 A. M.	17 15	151 41	pr. Several Az.	5 50	
13 Ditto	21 20	151 15	Ditto	5 40	
15 P. M.	22 8	150 55	Amplitude	5 37	
	23 37	150 37	Ditto	6 7	
18 { P. M.	26 10	149 46	Ditto	8 8	
18 { A. M.	26 30	Ditto	Ditto	7 58	
23 P. M.	30 43	148 0	Azimuths	7 30	
24 A. M.	32 40	147 14	Ditto	7 18	
27 Ditto	33 8	147 25	Ditto	6 40	
30 Ditto	38 3	147 6	Ditto	7 9	
September					
5 P. M.	38 29	145 32	Ditto	7 0	
13 Ditto	33 0	153 0	Ditto	8 8	

On shore at Fort Venus by four of Dr. Knight's compasses, which appeared to be all good.

From the Society Isles to New Zealand.

Time	Lat. in	Lon. in	Variation		Remarks	
			How found	Means		
1769 September	° /	° /		° /		
	South					
19 { P. M.	29 0	159 42	pr. Amplitudes	8 36 E.		
{ A. M.	29 0	159 25	pr. Sev. Azim.	8 29		
25 P. M.	33 30	163 40	Ditto	10 48		
October						
3 P. M.	36 50	173 46	Ditto	13 22		
4 P. M.	37 6	174 46	Ditto	12 48		
6 { P. M.	38 33	179 0	Ditto 12 50	12 59		
{ A. M.	39 0	180 0	Amplit. 12 48			
			1 Ditto	14 2		
7 P. M.	39 11	180 30	Azim. 15 4	15 4½	In sight of the East coast of New Zealand.	
			Ampl. 15 5			
15 P. M.	39 37	182 30	Azimuths	14 10	East coast of New Zealand.	
17 A. M.	40 0	182 0	Ditto	10 22		
November						
9	36 48	184 12	Several Azim.	11 9	} On shore in Mercury Bay, N. W. coast.	
25	35 50	185 15	Ditto	12 40		
26	35 15	Ditto	Amplitudes	13 10		
28	35 0	185 30	pr. Azimuths	11 45		
December						
8	34 42	185 30	pr. Amplitude	12 51	} Off the Northern parts of New Zealand.	
10 P. M.	34 40	186 15	Azim. 12 40	12 40		
			Ampl. 12 40			
11 P. M.	34 40	186 45	Amplitude	12 20		
25 A. M.	34 0	188 0	Several Azim.	11 25		
1770						
January						
6 A. M.	35 8	188 0	Ditto	12 26	} West coast.	
12 { P. M.	38 12	185 3	Ditto	15 0		
{ A. M.	39 0	Ditto	Ditto	14 15		
14 P. M.	39 40	Ditto	pr. Amplitudes	13 0		
15 A. M.	40 30	186 0	Azimuths	13 5		
February						
11 A. M.	41 0	183 0	pr. Amplitudes	14 0	}	
12 P. M.	41 26	184 0	Ditto	14 0		
14 Ditto	42 8	184 15	Azim. 15 8	15 4		
			Amp. 15 0			

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1770 February	° ' South	° ' South		° ' South	
17 A. M.	44 0	186 30	Ditto 14 32	14 24 E.	
18 Ditto	45 0	186 15	Ditto 14 16		
March			pr. Amplitudes	15 36	
1 P. M.	47 34	187 30	pr. Azimuths	16 34	East coast.
4 A. M.	46 30	189 0	Ditto	16 16	
7 { P. M.	46 54	191 0	Amplitude	15 10	
7 { A. M.	47 0	Ditto	pr. Azimuths	15 56	
9 P. M.	47 12	191 30	pr. Amplitudes	16 29	
15 P. M.	45 0	192 30	Ditto	15 2	
16 Ditto	44 27	191 15	pr. Azimuths	13 48	West coast.
25 A. M.	40 30	186 0	pr. Amplitudes	12 20	
April					
7 P. M.	37 15	196 40	Several Azim.	13 50	
8 P. M.	37 40	197 40	Ditto	13 56	
10 A. M.	38 45	202 23	Ampl. 11 25	11 22½	
			Azim. 11 20		
13 { P. M.	39 15	203 40	Amplitude	12 25	Between New Zeland and New Holland.
13 { A. M.	39 23	204 0	Azimuth	12 29	
14 P. M.	39 24	204 4	Ditto	11 28	
14 A. M.	39 23	204 15	Amplitude	11 30	
20 A. M.	37 0	210 0	Azimuth	10 40	
21 P. M.	36 35	210 0	Ditto	10 42	Coast of New South Wales on the East coast of New Hol- land.
22 A. M.	35 35	209 23	Ditto	9 50	
24 Ditto	35 35	209 0	Ditto	7 41	
24 { P. M.	35 18	209 11	Ditto	9 15	
25 { A. M.	34 0	208 50	Ampl. 9 36	9 21½	
25 { A. M.	34 0	208 50	Azim. 9 7		
26 P. M.	34 18	208 49	Several Azim.	8 48	
May					
7 { P. M.	33 50	208 37	Ditto	8 0	
7 { A. M.	33 22	208 20	D°. with needles	7 56	Mean of all the Compasses.
8 P. M.	Ditto	Ditto	Azimuths	8 25	
10	33 13	207 20	Ditto	8 0	
11 A. M.	32 40	206 36	pr. d°. and Amp.	9 10	
18	26 20	206 46	pr. Azimuths	8 40	
			Ditto	8 36	
19 { P. M.	25 34	206 45			
19 { A. M.	25 24	206 38	pr. Amplitudes	8 21½	
			pr. Azimuths		

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1770 May	° /	° /		° /	
	South				
20 P. M.	25 12		pr. Azimuth	8 45 E.	
22 { P. M.	24 34	307 40	pr. Amplitude	8 3	
{ A. M.	24 25	208 0	Azimuths	7 50	
26 P. M.	23 24	209 10	Ditto	7 28	
June					
3 A. M.	20 20	211 20	Ditto	6 57	
5 A. M.	19 18	212 30	Amplitude	5 35	
6 A. M.	19 4	212 50	Ditto	5 31	
7 { P. M.	19 0	213 15	Amplitude	5 25	
{ A. M.	18 52	213 35	Ditto	5 0	
9 A. M.	16 59	213 55	Ditto	4 53	
August					
23 P. M.	10 36	219 8	Amplitude	2 54	Straits between New Holland and New Guinea.
27 A. M.	10 3	220 45	Ditto	2 30	
28 P. M.	9 51	221 5	Ditto	2 51	
September					
2 P. M.	7 39	222 40	Ditto	2 34	Coast of N. Guinea.
3 Ditto	7 2	222 30	Ditto	2 4	
4 P. M.	6 18	222 10	Ditto	2 30	
9 P. M.	9 36	232 13	Azim. 0 12 } Amp. 0 5 }	0 8 $\frac{3}{4}$ W.	Between N. Gui- nea and Timor.
10 A. M.	9 50	232 57	Ditto	0 2	
13 Ditto	9 40	235 45	Amp. 1 10 } Azim. 1 27 }	1 18 $\frac{1}{2}$	
14 Ditto	9 50	235 45	Amp. and Azim.	2 4	East coast of Ti- mor.
17 P. M.	10 8	236 0	Amplitude	1 49	
24 Ditto	11 10	241 30	pr. Several Azim.	2 44	
27 Ditto	11 10	246 50	Ditto	3 10	South coast of Java.
1771					
January					
27 P. M.	10	256 32	Ditto	2 51	
February					
3 P. M.	15 52	264 36	Ditto	2 56	
7 P. M.	18 34	274 50	Ditto	3 24	
14 P. M.	21 56	287 10	Ditto	4 10	



Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1771 February	° /	° /		° /	
	South	West			
17 P. M.	23 20	297 18	pr. Several Azim.	0 20 W	Java head to the Cape of Good Hope.
20 P. M.	24 57	304 31	Ditto	12 15	
23 P. M.	26 59	311 28	pr. Amplitude	17 30	
25 { P. M.	27 55	314 0	pr. Azimuth	24 20	
{ A. M.	28 40	316 0	pr. Amplitude	24 0	
26 P. M.	28 54	316 30	Azimuths	26 10	
March					
4 P. M.	31 8	326 30	Ditto	25 35	By several observa- tions, From the Cape of Good Hope to England.
8 A. M.	34 20	333 0	Amp. 28 30 Azim. 28 8	28 19	
10 P. M.	35 40	337 10	pr. Amplitude	24 0	
12 P. M.	34 54	339 0	Ditto	22 30	
	Table Bay, Cape of Good Hope.			20 30	
April					
23 { P. M.	27 12	349 30	Amplitude	17 40	By several observa- tions, From the Cape of Good Hope to England.
{ A. M.	26 34	250 32	Azimuth	18 37	
24 { P. M.	26 12	350 46	Amplitude	17 —	
{ A. M.	25 26	351 16	Amp. and Azim.	17 30	
28 P. M.	19 50	357 0	Azimuth	14 0	
29 Ditto	18 30	359 6	Ditto	13 53	
May					
5 A. M.	15 25	7 0	Ditto	13 10	By several observa- tions, From the Cape of Good Hope to England.
7 Ditto	12 30	9 45	Ditto	12 50	
9 P. M.	10 24	12 0	Ditto and Amp.	11 00	
13 A. M.	3 18	17 46	Azimuth	10 00	
	North				
19 Ditto	4 20	21 51	Amplitude	7 40	
23 Ditto	7 40	26 0	Azimuth	9 40	By several observa- tions, From the Cape of Good Hope to England.
26 Ditto	10 38	29 22	Ditto	6 30	
31 Ditto	18 25	35 30	Ditto	5 9	
June					
1 A. M.	20 0	36 30		6 40	
2 Ditto	21 4	38 0	Ditto	5 4	
4 Ditto	23 30	40 0	Ditto	4 30	By several observa- tions, From the Cape of Good Hope to England.
6 Ditto	25 40	43 18	Ampl. 5 5 Azim. 6 4	5 34½	

Time	Lat. in	Lon. in	Variation		Remarks
			How found	Means	
1771 June	° /	° /		°	
	North	West			
7 A. M.	27 22	43 43	20 Azimuths	5 20 W.	
8 Ditto	28 30	43 42	Ditto	5 24	
9 Ditto	29 51	44 9	Amp. 7 3 Azim. 7 30	7 17	
10 P. M.	30 26	44 15	Ampl. 9 18 Azim. 9 —	9 9	
12 P. M.	32 16	45 14	Amplitude	7 0	
A. M.	32 40	45 0	Azimuths	6 55	
P. M.	33 16	44 53	Azim. and Amp.	8 23	
13 { A. M.	33 53	44 25	Ampl. 8 15 Azim. 8 14	8 14½	
14 P. M.	34 36	Ditto	Amplitude	8 14	
17 Ditto	38 26	40 20	Azimuth	9 1	
18 { P. M.	39 12	39 0	Azim. 14 13 Ampl. 14 18	14 15½	
A. M.	39 22	38 0	Amplitude	14 24	
30 { P. M.	43 55	17 16	Azimuth	18 30	
A. M.	44 30	16 18	Ditto	19 30	
July					
1 { P. M.	44 40	15 44	Azimuths	23 0	
A. M.	44 50	16 10	Ditto	22 50	
3 P. M.	45 —	13 0	Ditto	20 36	
4 { P. M.	45 30	10 45	15 Azimuths 2 Amplitudes	21 25½	
A. M.	45 20	9 37	20 Amplitudes 12 Azimuths	21 10	
7 P. M.	45 45	8 38	Amplitude	22 30	

Extract from Capt. Cook's Journal.

Nov. 9 At 8 A. M. Mr. Green and I went on shore, to observe the  
1771 Transit of Mercury, which came on at 7<sup>h</sup> 20' 58" apparent  
time, and was observed by Mr. Green alone; I at this time  
was taking the Sun's altitude in order to ascertain the  
time.

		h	'	"	
Mr. Green	Internal contact	12	8	58	} P. M.
	External contact	—	9	55	
C. Cook	Internal contact	—	8	45	
	External contact	—	9	48	

Lat. observed at noon 36° 48' 28", the mean of this and yesterday  
observations gives 36° 48' 5½" South, the latitude of the place of  
observation. The variation of the compass was found to be 11° 9'  
East.

\* \* \* These observations were made by the help of a Graham's watch  
with a second hand; corrected by observed altitudes of the Sun.